

Integrated Composite - Heatpipe Radiator Panel, Phase I

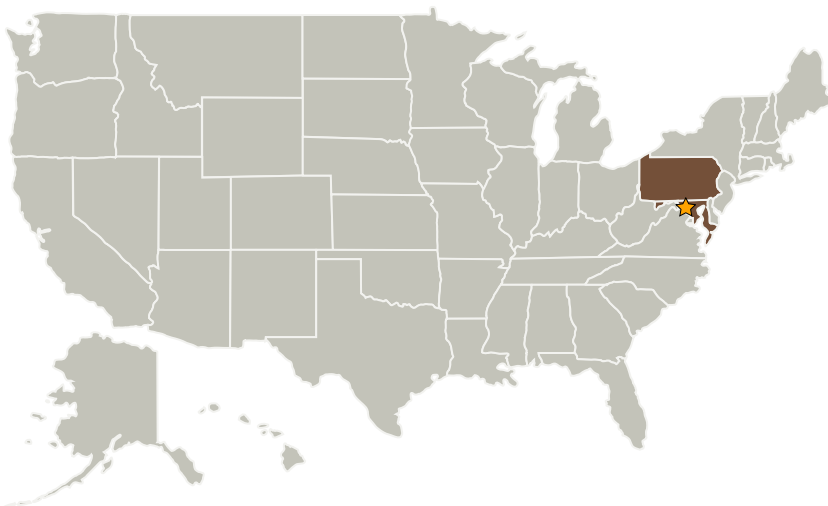
Completed Technology Project (2009 - 2009)



Project Introduction

A major objective of the NASA science spacecraft systems development programs is to implement science measurement capabilities using small affordable spacecrafts. High conductivity materials to minimize temperature gradients and provide high efficiency radiators and heat spreader panels are required to meet this objective. Under this proposed effort, kTC will develop a high performance thermal distribution panel (TDP) concept. The panel will be fabricated with a high conductivity macro composite skin and in situ heat pipes. The processing technologies proposed to build such a panel can also be used to produce this panel with high structural stiffness, similar to aluminum honeycomb type structure currently in use. This advanced TDP material concept will have high conductance the will obviate the need for attached bulky metal thermal doublers and heat pipe saddles. The conductivity of the proposed material system can be configured to exceed 800 W/mK with a mass density below 2.5 g/cm³. This material can provide efficient conductive heat transfer between the in situ heat pipes permitting the use of thinner panel thicknesses further reducing the mass of this critical spacecraft subsystem. This concept will also obviate reliability challenges due to CTE mismatch between structures and the heat pipes. In the Phase I program, kTC will produce prototypes employing the proposed TDP concept. In Phase II, in conjunction with kTC's Tier I team members, the qualification and integration of the concept into spaceflight hardware will be pursued.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
k Technology, a division of Thermacore Inc.	Supporting Organization	Industry	Langhorne, Pennsylvania

Primary U.S. Work Locations	
Maryland	Pennsylvania

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.3 Heat Rejection and Storage